Net neutrality: A complex issue, then and now

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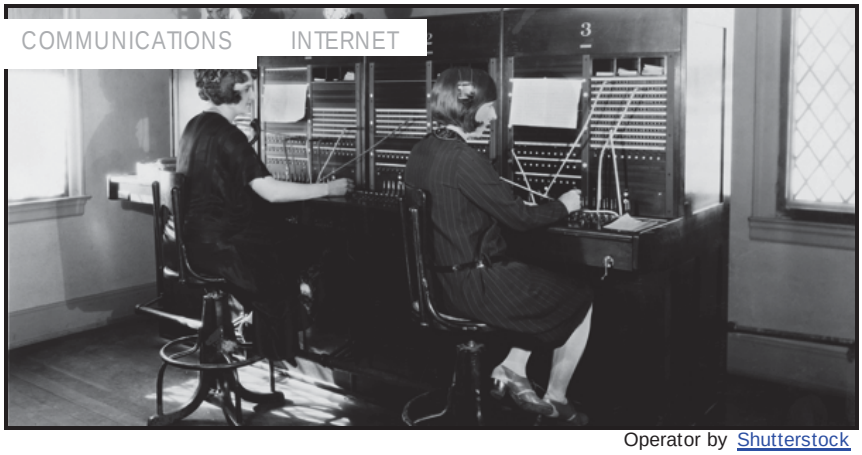

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Network Neutrality debates are fundamentally about switching – whether network switches can treat some packets differently from others. In this piece, I look back 100 years to the telephone interconnection debates of the early 20th century – and, in particular, to AT&T's preference for (non-neutral) manual switchboards over (neutral) automatic switches. This history reminds us that design decisions in complex networks are rarely as simple as network neutrality proponents suggest they are – and that market forces, if given time to operate, can secure the consumer benefits that regulators aspire to promote without the appurtenant risk that regulatory intervention may stunt the market.

The DC Circuit argument in Verizon's challenge to the FCC's Open Internet rules dominated tech and telecom news earlier this month. While analysis will surely continue – I'm unofficially obliged to nod to our own coverage here at TechPolicyDaily.com, as well as to the analysis of my colleagues at Truth on the Market (which has thus far proved eerily prescient, and where I am soon to post an extended discussion of the ideas discussed below) – I'd like to take this post to reflect on a ghost of telecommunications' past: the efforts – and fights – over interconnection of local telephone exchanges, and in particular the use of manual switchboard versus automatic switching, in the early 20th century.

Starting in 1907, interconnection was one of the great projects of the telephone industry. Up until that point, local exchange carriers frequently competed head to head in overlapping geographies. It was common for a single town to have both an AT&T-affiliated exchange and an independent exchange. And, amazing to modern readers, customers of one exchange could not call customers of the other!

AT&T changed its policies in 1907, in favor of what was then styled “universal service,” meaning that any telephone customer should be able to call any other telephone customer – an idea different than today’s meaning of the term. AT&T’s approach was largely to acquire competing local exchanges and to merge them into its own network or and to allow interconnection via its long-distance network. But it also agreed to, or was often subject to laws requiring, more direct interconnection between local exchanges (so-called “physical connection” of the exchanges).

Throughout this period, there were frequent complaints about AT&T operators discriminating against or dropping calls from or to customers on independent operators. These complaints were, of course, in addition to complaints that AT&T would not interconnect local exchanges (directly or via long distance lines), or charged too much to do so.

Adding to this, up until 1919 AT&T doggedly refused to adopt automatic switching technologies. Automatic switching (that is, mechanical switches, operated by the caller entering a number into his phone, and that therefore did not rely on switchboard operators) had been developed in 1888, patented in 1891, and widely adopted by independent exchanges over the next 20 years. Since automatic switches remove operators from the local exchange, they would have addressed many of the independents’ concerns about AT&T operators discriminating against their customers’ calls. But, until an operators’ strike in 1919 increased the labor cost of manual switchboards, AT&T refused to adopt this technology. Indeed, whenever it acquired an automatic independent exchange, it would replace that exchange’s automatic switch with a manual switchboard.

This history is an interesting precursor to the modern concept of network neutrality. AT&T, through its operators, allegedly offered preferential service to its own customers, blocked or dropped calls to or from its competitors’ networks, and offered a slower or otherwise lesser quality of service to calls to or from its competitors’ networks. (It is worth noting, too, that this was surely not the first case of non-neutrality-like conduct – for instance, the automatic switch was developed in response to alleged discrimination by a phone operator (directing business to her paramour), and the telegraph industry faced concerns about how it controlled access to news and information in the late 19th century.)

What does this tell us about the modern network neutrality discussion? The obvious answer is that it is an example of the monopolist service provider benefiting from blocking and discriminating against its competitors. Given that it could profit from disadvantaging its competitors, AT&T was happy to use a technology that facilitated such discrimination, and may even have encouraged it. This surely is the perception that AT&T’s competitors had.

But, then, as today, the situation was somewhat more complicated than the simple narrative suggests. While AT&T may not have minded that its switchboard operators were a burden to its competitors, it had independent reasons to operate in this way. The fact that AT&T would replace automatic switches with manual switchboards – even in exchanges where it had no competitors to disadvantage by such a move – demonstrates some other motivation.

There are several explanations for AT&T’s switchboard preference. The most common explanation is that

AT&T believed its customers preferred the experience of operator-mediated connections. While this may seem anachronistic today, it makes sense if you consider the disdain that many of us have for “interactive menus” – when you call up customer support, you almost certainly prefer to speak to a human over having to press a bunch of buttons.

But there were more reasons for AT&T to prefer manual switchboards. First, automatic switches couldn’t interface with its long distance service. Independent exchanges were, first and foremost, local exchanges that made some effort to offer basic long distance service, for who automatic switches’ inability to interface with long distance service presented little burden. ; AT&T was first and foremost a long distance carrier that interconnected local exchanges – its local exchanges had to seamlessly integrate into its long distance network. Related to this, its operators were trained, and developed an expertise, to place calls on its long distance network. They had a language, or API, that allowed them to establish long-distance calls quickly and efficiently. The independent exchange operators didn’t speak this language as well, so naturally received less efficient service. This language can be thought of both as an operating efficiency and a fixed cost.

AT&T was also investing heavily in building out and improving its long-distance service, and also continuing to build out its local exchanges. Developing and implementing a new exchange technology would have distracted from its long-distance efforts. And, much of its expansion, especially into rural areas, relied upon party-lines. These lines could not be billed using automatic switches.

A final reason for AT&T’s preference for manual switchboards was that operators were cheap. It wasn’t until the operators’ strike of 1919, in which 6,000 operators in the north east stopped work and ultimately negotiated higher salaries, that AT&T decided to adopt automatic switches, a decision that reflected not only the higher labor costs but also the fact that the operators had proved themselves to be potentially less reliable than the automatic switches.

This history, and these explanations, are surely not complete. Proponents of network neutrality can surely differentiate this history from the modern setting, much of AT&T’s conduct in this era is legitimately questionable, and the subsequent history (aided by technological change) vindicates many of the concerns about AT&T’s conduct (but also justifies much of AT&T’s conduct).

While this history doesn’t answer our modern questions about network neutrality, it does offer lessons. Perhaps most salient, we should remember that the networks of 100 years ago were far less complicated than today’s networks. So, too, were the services they offered. Yet even in that relatively simple setting the economics of those networks – and the factors that went into AT&T and the independents’ economic decisions – were quite a bit more complicated than usually understood. AT&T’s reluctance to embrace automatic switching resulted from its efforts to balance competing market incentives – to offer high-quality but low cost local and long distance service (best done with manual switchboards), on the one hand, with offering the better local but worse long distance service (with automatic switches) on the other. These are exactly the issues we want firms to struggle with.

Network neutrality presents much the same question: how to best provide switching to different types of

services. We've been here before. As in the 1910s, the concern is on the one hand that broadband providers' switching decisions can harm other firms but on the other hand that they can better facilitate high-value services with particular network requirements. These tradeoffs exist today, and will exist 100 years from now – they are inherent in any complex network.

One hundred years ago, AT&T struggled with these issues and ultimately adopted automatic switches – it did so in response to market forces, not regulatory fiat. It is scary to think how things may have been different had the government intervened and specified which switching technologies AT&T had to use — free from such government oversight, Bell Labs went on to develop the first electronic switches, which became the first computers, and helped pave the way for the switches that power the Internet today.

Yet today, despite the market being more competitive and subject to more scrutiny than AT&T was 100 years ago, network neutrality proponents advocate regulatory control of switching – government edicts saying what switching technologies can and cannot be used (and therefore, can or cannot be further developed). And this despite little evidence that network neutrality poses anything more than hypothetical harms. The market has worked in the past – how about we give it a chance today, before deciding to regulate it? If things don't work out, if the net-neutrality proponents' parade of horribles does come to pass, regulatory intervention will still be an option. Until then, we should be cautious of the impulsive regulatory instinct: too-readily opting for regulation over the market is the sort of automatic switch we should avoid.